

Knowledge and Symptom-Based Assessment of COVID-19 among Rural Dwellers in Amakohia, Ihitte-Uboma Local Government Area, Imo State Nigeria

Authors:

Obiefule JC¹, Asiegbu FT² and Ugwuegbulam OP³

¹Department of Medical Biochemistry, Imo State University Owerri Nigeria.

²College of Nursing Sciences Jaji Abuja.

³Department of Biology, Federal University of Technology Owerri Imo State.

*Corresponding Author:

Obiefule JC, Department of Medical Biochemistry, Imo State University Owerri Nigeria.

Orcid ID: <https://orcid.org/0009-0009-5772-0619>

DOI: <https://doi.org/10.5281/zenodo.21585521>

Received: 01 July 2026, Accepted: 20 July 2026, Online First: 26 July 2026

ABSTRACT

Coronavirus virus (COVID-19) remains a major public health concern worldwide. This study assessed the Knowledge and Symptom-Based Assessment of COVID-19 among Rural Dwellers in Amakohia, Ihitte-Uboma Local Government Area, Imo State Nigeria. A descriptive cross-sectional survey was conducted among 100 residents of Amakohia using a structured, self-administered questionnaire. Information was collected on respondents' demographic characteristics, knowledge of COVID-19, perceived modes of transmission, preventive measures, treatment options, and self-reported COVID-19-related symptoms. Data were analyzed using descriptive statistics and presented as frequencies and percentages. The results showed that the majority of respondents were females aged 18–44 years, single, and had formal education. Overall, **95%** of respondents were aware of COVID-19, while **82%** believed that the disease was real. Radio was the leading source of information (30%). Most respondents (95%) correctly identified the modes of transmission, with **65%** recognizing coughing and sneezing as the major route and **30%** identifying aerosol transmission. The majority perceived that individuals of high socioeconomic status (59%) and the elderly (63%) were the most affected by the disease. All respondents believed that COVID-19 could be treated, and 75% identified hospital care as the appropriate place for treatment. Fever (**24%**) and sneezing (**43%**) were the most commonly reported symptoms experienced during the preceding three months. Respondents also demonstrated good knowledge of the recommended preventive measures, particularly regular hand washing with soap and water. Although awareness of COVID-19 among rural dwellers was high, misconceptions regarding the reality of the disease and treatment still existed. Continued public health education is needed to improve accurate knowledge, dispel misinformation, and encourage appropriate health-seeking behavior.

Keywords: Symptom, Assessment, Knowledge, Covid 19, Rural dwellers

INTRODUCTION

Coronavirus disease 2019 (COVID-19), caused by the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), is a highly infectious viral disease that has posed unprecedented challenges to global public health. Coronaviruses are a large family of viruses that primarily infect the human respiratory tract, causing illnesses ranging from the common cold to severe respiratory diseases. SARS-CoV-2 is transmitted

predominantly through respiratory droplets and close person-to-person contact, although transmission through contaminated surfaces and aerosols may also occur under certain conditions (Chan et al., 2020). The virus initiates infection by binding the receptor-binding domain (RBD) of its spike protein to the angiotensin-converting enzyme 2 (ACE2) receptor on host cells, facilitating viral entry and replication (Lippi and Henry, 2020; Pinheiro et al., 2019). Consequently, preventive measures aimed at

reducing person-to-person transmission, particularly among vulnerable populations such as the elderly, children, healthcare workers, and individuals with underlying medical conditions, remain essential for controlling the spread of COVID-19 (Chan et al., 2020). The clinical manifestations of COVID-19 vary considerably, ranging from asymptomatic infection to severe respiratory illness and death. Following exposure, symptoms typically develop after an average incubation period of approximately 5.2 days. The interval from symptom onset to death has been reported to range from 6 to 41 days, with a median duration of about 14 days, depending largely on the patient's age, immune status, and underlying health conditions (Guan et al., 2020). Older adults, particularly those above 70 years of age, generally experience more rapid disease progression and poorer clinical outcomes than younger individuals (Guan et al., 2020). Since its emergence in Wuhan, China, in late 2019, COVID-19 rapidly spread across continents and was declared a global pandemic by the World Health Organization. The pandemic has significantly affected healthcare systems, economies, and social activities worldwide. Although diagnostic methods, treatment strategies, and vaccination programmes have substantially improved, COVID-19 continues to pose public health challenges in many countries, including Nigeria. Confirmed cases have been reported across all states of the country, including Imo State. However, the actual burden of infection is likely higher than reported because of limited diagnostic testing, underreporting, and the presence of asymptomatic or mildly symptomatic infections.

In many malaria-endemic communities in Nigeria, including those in Imo State, COVID-19 symptoms such as fever, headache, fatigue, and body pains overlap considerably with those of malaria and other common infectious diseases. This similarity may result in misdiagnosis or delayed diagnosis, particularly where access to affordable COVID-19 testing is limited. In addition, many individuals with mild symptoms may not seek medical attention because the illness is perceived to be self-limiting or attributable to malaria, thereby contributing to an underestimation of the true occurrence of COVID-19 within the community. Knowledge of COVID-19 plays a critical role in influencing preventive behaviours, healthcare-seeking practices, and adherence to public health interventions. Adequate community awareness can enhance early recognition of symptoms, encourage timely testing, and reduce disease transmission. Despite the importance of community knowledge in controlling infectious disease outbreaks, there is limited documented information regarding the level of COVID-19 knowledge among residents of Amakohia, Ihitte Uboma Local Government Area of Imo State. Therefore, this study was undertaken to assess the

Knowledge and Symptom-Based Assessment of COVID-19 among Rural Dwellers in Amakohia, Ihitte-Uboma Local Government Area, Imo State. The findings will provide baseline information on community awareness of COVID-19 and offer insight into the possible occurrence of undiagnosed or misdiagnosed infections resulting from symptom overlap with other endemic diseases. The information generated will also support the development of targeted health education and public health interventions aimed at improving COVID-19 awareness, promoting appropriate healthcare-seeking behaviour, and strengthening disease surveillance within the community.

Objectives of the Study

The objectives of this study were to:

1. Assess the level of awareness and knowledge of COVID-19 among rural dwellers in Amakohia community.
2. Evaluate respondents' knowledge of the modes of transmission, symptoms, prevention, and treatment of COVID-19.
3. Determine the healthcare-seeking behaviour of respondents following COVID-19-related symptoms.
4. Identify the major sources of information regarding COVID-19 among the study population.

MATERIALS AND METHODS

Study Area

This study was conducted in Amakohia, a community located in Ihitte Uboma Local Government Area of Imo State, Nigeria. The community lies at approximately latitude 5°37'5"N and longitude 7°21'11"E. The area experiences a tropical climate characterized by distinct rainy and dry seasons. The rainy season typically begins in April and extends through October, with an annual rainfall ranging from 1,500 mm to 2,200 mm. The mean annual temperature exceeds 20°C, while the average relative humidity is approximately 75%, increasing to about 90% during the peak of the rainy season. The residents of Amakohia are predominantly traders, civil servants, and farmers. Agriculture is a major occupation, with many households engaging in both subsistence and commercial farming. Other agricultural products include a variety of vegetables, palm oil, palm kernel products, locally made brooms, and woven baskets. Amakohia is also known for its rich cultural heritage. The community celebrates several traditional festivals, the most prominent being the Iwa-Akwa Festival, which marks the transition to adulthood and serves as a unifying event for the people of Amakohia. Other important cultural festivals celebrated in the community include the Okonko and Mbomuzo festivals.

Study Population

The study population comprised 100 consenting residents of Amakohia community in Ihitte Uboma Local Government Area who voluntarily gave their consent.

Data Collection

Data were collected using a structured questionnaire designed specifically for the study. The questionnaire was organized into three sections. Section A obtained respondents' socio-demographic information, including age, sex, religion, marital status, occupation, and monthly income. Section B assessed respondents' knowledge of COVID-19, including its transmission, prevention, and treatment. Section C evaluated respondents' knowledge of the common signs and symptoms associated with COVID-19 infection.

Statistical Analysis

Data were analysed using **IBM SPSS Statistics version 25.0**. Respondents' socio-demographic characteristics and their level of knowledge regarding COVID-19 were summarized using frequencies and percentages. Percentage distributions were calculated based on the number of respondents who selected each response, and the results were presented in tables where appropriate.

Sample Size Determination

A sample size of 100 respondents was used for this study. The sample size was determined based on the available eligible population and the willingness of residents to participate during the study period.

Sampling Technique

A convenience sampling technique was employed to recruit consenting adult residents of Amakohia community who were available during the period of data collection.

Inclusion Criteria

Participants were included if they:

- Were residents of Amakohia community.
- Were 18 years of age or older.
- Gave informed consent to participate in the study.

Exclusion Criteria

Individuals who declined to participate, were seriously ill at the time of data collection, or submitted incomplete questionnaires were excluded from the study.

Ethical Approval

Ethical approval for this study was obtained from the appropriate Institutional Health Research Ethics Committee before commencement of the study.

Informed Consent

Written informed consent was obtained from all participants before administration of the questionnaire. Participation was entirely voluntary, and respondents were free to withdraw from the study at any stage without any consequences.

Validity and Reliability of the Questionnaire

The questionnaire was developed after reviewing relevant literature and was validated by experts in Public Health and Medical Laboratory Science for clarity, relevance, and content validity. A pilot study was conducted among individuals outside the study area to ensure the reliability and comprehensibility of the instrument before final administration.

RESULTS

The socio-demographic characteristics of the respondents are presented in Table 1. Females constituted the majority of the respondents (60.0%), while males accounted for 40.0%. The highest proportion of respondents (62.0%) was within the 18–44 years age group, followed by those aged 45–64 years (30.0%). Respondents aged 65–70 years accounted for 6.0%, whereas those above 70 years represented the smallest proportion (2.0%). With respect to marital status, single respondents constituted the largest group (44.0%), followed by married respondents (38.0%). Divorced and widowed respondents accounted for 11.0% and 5.0%, respectively, while separated respondents represented the smallest proportion (3.0%). Regarding educational attainment, over half of the respondents (52.0%) had tertiary education, 32.0% had secondary education, and 14.0% had primary education. Only 4.0% of the respondents had no formal education. The occupational distribution showed that unemployed respondents constituted the highest proportion (25.0%), followed by self-employed individuals and artisans (23.0%), students (19.0%), traders (14.0%), and civil/public servants (10.0%). Caregivers/Health Personnel accounted for the least proportion of respondents (9.0%), while farmers constituted 14.0% of the respondents. In terms of religion, the majority of respondents were Christians (84.0%), followed by traditional worshippers (13.0%), while Muslims constituted the smallest proportion (3.0%). Table 2 presents respondents' awareness, perception, and sources of information on COVID-19. The findings showed that 95.0% of the respondents had heard about COVID-19, and 82.0% considered it a real disease of public health concern. Among those who were aware of the disease, radio was the most common source of information (30.0%), followed by social media (26.3%), churches (15.8%), friends (14.7%), television (4.2%), and town criers (2.1%). Respondents' knowledge of the modes of COVID-19 transmission is presented in Table 3. The

majority of respondents (65.0%) correctly identified coughing and sneezing as the primary means of transmission, while 30.0% identified airborne or aerosol transmission. None of the respondents believed that COVID-19 could be transmitted through insects, witchcraft, deities, or sexual intercourse. Table 4 summarizes respondents' perceptions of the population most affected by COVID-19. Most respondents (59.0%) believed that individuals of high socioeconomic status were more affected by the disease. In comparison, 15.0% believed that people of low socioeconomic status were the most affected, while 12.0% identified those in the middle socioeconomic class. Respondents' knowledge of COVID-19 prevention and treatment is presented in Table 5. All respondents believed that COVID-19 could be treated. Among them, 75.0% identified hospital treatment as the appropriate means of management, while 11.0% believed treatment with conventional drugs was effective, 9.0% preferred herbal remedies, and 5.0% believed that good nutrition alone could cure the disease. Regarding preventive measures, regular handwashing with soap and water was the most frequently identified preventive practice (55.0%). The use of hand sanitizers was reported

by 22.0% of respondents, while social distancing and avoiding crowded places were identified by 11.0% and 10.0% of respondents, respectively. Healthy nutrition was the least reported preventive measure (2.0%). Table 6 presents respondents' experiences of COVID-19-related symptoms within the three months preceding the study. All respondents reported experiencing one or more illnesses during this period. Sneezing was the most frequently reported symptom (43.0%), followed by fever (24.0%). Other symptoms were reported less frequently as presented in Table 6. Table 7 presents respondents' treatment preferences and healthcare-seeking practices. Although all respondents believed that COVID-19 could be treated, the majority (75.0%) identified hospital care as the appropriate place for treatment (Table 5). However, when asked about their preferred treatment option, 75.0% reported a preference for non-orthodox medicine, while 25.0% preferred orthodox medicine (Table 7). Regarding healthcare utilization, medicine stores were the most common source of medical care (30.0%), followed by government hospitals (27.0%), private hospitals (20.0%), pharmacies (18.0%), traditional herbalists (3.0%), and spiritual healing homes (2.0%).

Table 1: Demographic Characteristics of the respondents

Characteristics	No. of Respondents	Percentage (%)
Sex		
Male	40	40.0
Female	60	60.0
Age		
18-44	62	62.0
45-64	30	30.0
65-70	6	6.0
>70	2	2.0
Marital Status		
Single	44	44.0
Married	38	38.0
Divorced	11	11.0
Widowed	5	5.0
Separated	3	3.0
Educational Status		
None	4	4.0
Primary	14	14.0
Secondary	32	32.0
Tertiary	52	52.0
Occupation		
Unemployed	25	25.0
Civil/Public Servant	10	10.0
Caregiver/Health Personnel	9	9.0
Farmers	14	14.0
Students	19	19.0
Self-Employed/Artisan	23	23.0
Religion		
Christianity	84	84.0

Islam	3	3.0
Traditional Worshipper	13	13.0

Table 2: Knowledge, Perception of Covid and source of Information of respondents

Variables	No. of Respondents	Percentage (%)
Have you heard about COVID-19?		
Yes	95	95.0
No	5	5.0
Do you believe that this disease is real?		
Yes	82	82.0
No	18	18.0
If yes, in question 7 what is your source of information?		
Social media	25	26.3
Radio	30	31.6
Friends	14	14.7
Relatives	10	10.5
Church	15	15.8
Town Criers	2	2.1
Television	4	4.2

Table 3: Respondents' Knowledge on Mode of Transmission

Variables	No. of Respondents	Percentage (%)
Do you know how COVID-19 is transmitted?		
Yes	95	95.0
No	5	5.0
Mode of Transmission		
Coughing/Sneezing	65	65.0
Aerosol	30	30.0
Transmitted by insects	0	0.0
Witches and the gods	0	0.0
Sexual intercourse	0	0.0
Total	95	95.0

Only respondents who answered "Yes" to awareness of COVID-19 (n = 95) responded to this question.

Table 4: Respondents' Knowledge on people and age most affected

Variables	No. of Respondents	Percentage (%)
People Mostly Affected		
People of high socioeconomic class	59	59.0
People of middle socioeconomic class	12	12.0
People of low socioeconomic class (poor people)	15	15.0
I don't know	14	14.0
Age mostly infected		
The elderly	63	63.0
Middle aged	21	21.0
Youth	3	3.0
Children	2	2.0
No idea	11	11.0
Total	100	100.0

Table 5: Respondents' Knowledge on Prevention and Control of COVID-19

Variables	No. of Respondents	Percentage (%)
Can Corona Virus Disease be Cured?		
Yes	100	100.0
No	0	0.0
Means of Cure		
Going to Hospital	75	75.0
Taking Drugs/Medication	11	11.0
Drinking Herbal Medicine	9	9.0
Eating Good Food	5	5.0
Preventive Measures		
Washing hands with soap	55	55.0
Use of sanitizer	22	22.0
Avoiding crowded meetings	10	10.0
Social distancing	11	11.0
Healthy nutrition	2	2.0

Table 6: Respondents' Knowledge on Symptoms of COVID-19

Variables	No. of Respondents	Percentage (%)
Have you experienced illness in the last three months?		
Yes	100	100.0
No	0	0.0
Symptoms		
Difficulty in breathing	10	10.0
Loss of consciousness	3	3.0
Chest pain	9	9.0
Sneezing	43	43.0
Loss of speech or movement	0	0.0
Loss of smell/taste	7	7.0
Fever	24	24.0
Dry or worsening cough	2	2.0
Tiredness	4	4.0
Have you recovered from the symptoms?		
Yes	97	97.0
No	3	3.0
Total	100	100.0

Table 7: Respondents' Treatment Preferences and Healthcare-Seeking Practices

Variables	No. of Respondents	Percentage (%)
Knowledge on Treatment		
Orthodox Medicine	25	25.0
Non-Orthodox Medicine	75	75.0
Both	0	0.0
Spiritual Healing	0	0.0
Where did you receive the medical attention?		
Medicine store	30	30.0
Pharmacy	18	18.0
Government hospital	27	27.0

Private hospital	20	20.0
Traditional herbalist	3	3.0
Spiritual healing home	2	2.0
Total	100	100.0

DISCUSSION

Since its emergence in late 2019, Coronavirus Disease 2019 (COVID-19) has evolved into one of the most significant global public health emergencies, affecting virtually every country worldwide (WHO, 2020). This study assessed the Knowledge and Symptom-Based Assessment of COVID-19 among Rural Dwellers in Amakohia, Ihitte-Uboma Local Government Area, Imo State Nigeria. Understanding the level of community knowledge regarding COVID-19 is essential for promoting appropriate preventive practices and reducing disease transmission during a pandemic. The findings of this study revealed that the majority of respondents (95.0%) were aware of COVID-19, indicating a high level of awareness among rural dwellers. This suggests that public health awareness campaigns were effective in reaching the study population despite the rural setting. Adequate knowledge of infectious diseases is an important determinant of preventive health behaviour, as informed individuals are more likely to adopt recommended infection prevention and control measures. Radio emerged as the predominant source of information on COVID-19 among respondents, followed by social media and other mass communication channels. This finding is consistent with previous studies conducted in Nigeria by Iwunze (2023), Akanbi et al 2021 (2020) and Olapegba et al 2020 which identified radio as one of the most accessible and reliable sources of health information, particularly in rural communities. Similarly, studies conducted during the Severe Acute Respiratory Syndrome (SARS) outbreak reported that traditional mass media played a critical role in disseminating health information during epidemics (Won et al., 2020, Wu et al., 2020). However, the present finding differs from that of Ruiu and Althaus (2020), who reported that the internet was the primary source of information during infectious disease outbreaks. The dominance of radio in the present study may reflect limited internet access and greater dependence on traditional media among rural populations. Consequently, government agencies, health authorities, and non-governmental organizations should continue to utilize radio and other community-based communication platforms to disseminate accurate and timely public health information. With regard to knowledge of COVID-19 symptoms, Sneezing (43%) was the most frequently reported symptom, followed by fever (24%) by respondents. Although fever is a well-recognized symptom of COVID-19, the high proportion of respondents identifying sneezing as the primary symptom may indicate the persistence of misconceptions

regarding the clinical presentation of the disease. This finding highlights the need for continuous public health education to improve community understanding of the common symptoms of COVID-19 and distinguish them from those of other respiratory infections. The majority of respondents reported adopting preventive measures such as regular handwashing with soap and water, use of hand sanitizers, maintaining social distancing, avoiding crowded gatherings, and practicing healthy nutrition. Regular handwashing with soap and water was the most frequently reported preventive measure (55.0%), followed by the use of hand sanitizers (22.0%), indicating good awareness of recommended infection prevention practices among the respondents. These findings suggest a positive attitude toward preventive measures and are consistent with previous studies by Adhikari et al. (2020) and Huang et al. (2020), which reported that adequate knowledge of infectious diseases promotes the adoption of appropriate preventive behaviours.

Despite the generally high level of awareness, some misconceptions regarding COVID-19 remained. A notable proportion of respondents either doubted the reality of the disease or preferred non-orthodox treatment despite recognizing hospitals as the appropriate place for care. These findings suggest that accurate knowledge does not always translate into evidence-based health-seeking behaviour. Continuous public health education is therefore required to address misconceptions and promote appropriate utilization of healthcare services. This observation agrees with Abati (2020), who emphasized that misconceptions and misinformation may undermine public health interventions. Religious leaders and community stakeholders should therefore collaborate with public health authorities to provide accurate health information while encouraging adherence to recommended preventive practices. Overall, the findings suggest that respondents possessed relatively good knowledge of COVID-19 transmission, prevention, and control, although certain misconceptions remain. Consistent with Richards (2017), improved public knowledge of infectious diseases encourages appropriate behavioural changes that reduce disease transmission. Therefore, continuous health education remains essential for strengthening community preparedness and response to emerging infectious diseases.

Limitations of the Study

This study had some limitations. The relatively small sample size and the use of a single rural community may limit the generalizability of the findings to other

populations. Furthermore, the information obtained was based on self-reported responses and may be subject to recall and response bias. The cross-sectional nature of the study also limits the ability to establish causal relationships.

Strength of the Study

This study provides baseline information on COVID-19 knowledge, symptom perception, and healthcare-seeking behaviour among rural dwellers in Amakohia community. The findings may assist policymakers and public health authorities in planning targeted health education programmes for rural populations.

CONCLUSION

This study demonstrated that residents of Amakohia community possess a relatively high level of awareness and knowledge regarding COVID-19, particularly with respect to its transmission, symptoms, preventive measures, and sources of information. It is therefore recommended that government agencies, healthcare professionals, non-governmental organizations, community leaders, and religious institutions intensify public awareness programmes on COVID-19 and other emerging infectious diseases. Health education should be delivered in local languages and through communication channels that are readily accessible to rural populations, particularly radio and community outreach programmes. Furthermore, interventions should specifically target vulnerable and underserved populations to ensure equitable access to accurate health information and promote compliance with recommended preventive measures. Such coordinated efforts will strengthen community resilience and improve preparedness for future public health emergencies. However, misconceptions regarding the reality of COVID-19 and preference for non-orthodox treatment highlight the need for sustained community-based health education.

Funding

The authors received no financial support for the research, authorship, and publication of this article.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this study.

Data Availability Statement

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

Acknowledgement

The authors sincerely appreciate all the residents of Amakohia community who voluntarily participated in this

study. We also acknowledge everyone who contributed directly or indirectly to the successful completion of this research.

Author Contributions

Obiefule JC: Conceptualization, study design, data collection, data analysis, manuscript preparation.

Asiegbu FT: Supervision, methodology, critical revision of the manuscript.

Ugwuegbulam OP: Literature review, data interpretation, manuscript editing and final approval.

Consent for Publication

All authors have read and approved the final version of the manuscript and consent to its publication.

REFERENCES

1. Adhikari, S.P., Meng, S., Wu, Y.J., Mao, Y.P., Ye, R.X., Wang, Q.Z. Sun, C., Sylvia, S., Rozelle, S. and Raat, H. (2020). Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: A scoping review. *Infect. Dis Poverty*. 9:29.
2. Akanbi, M.A., Fagbamigbe, A. F., Bamgboye, E. A., & Agunbiade, M. B. (2021). Knowledge, attitudes and practices towards COVID-19 among university students in Nigeria. *PLoS One*, 16(3), e0247005.
3. Chan, J. W., Yuan, S., Kok, K. H., To, K. W., Chu, H., Yang, J., and Yuen, K. Y. (2020). A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: A study of a family cluster. *The Lancet*. 395 (10223): 514 – 523
4. Guan, W. J., Ni, Z. Y. and Hu, Y. (2020). Clinical Characteristics of Coronavirus Disease 2019 in China. *N Engl J Med*. 10.1056
5. Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J. and Hu, Y. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 395:497–506.
6. Iwunze, J.I. (2023): Knowledge, attitudes and perception on prevention and control of COVID-19 in Obowo Local Government Area Imo State Nigeria. *International Journal of Biology Sciences* 5 (1): 95 -98
7. Lippi, G. and Henry, B. M. (2020). Active smoking is not associated with severity of coronavirus disease 2019 (COVID-19). *Eur J Intern Med*. S0953 6205(20)30110-2.
8. Memish, Z.A., Zumla, A.I., Al-Hakeem, R.F., Al-Rabeeh, A.A., Stephens, G.M. (2013). Family

- cluster of Middle East respiratory syndrome coronavirus infections. *N Engl J Med.*, 368(26):2487–94.
9. Olapegba, P. O., Lorfa, S. K., Kolawole, S. O., Oguntayo, R., Gandi, J. C., & Ottu, I. F. (2020). Survey data on COVID 19 related knowledge, risk perceptions and precautionary behavior among Nigerians. *Data Brief*, 30, 1-6.
 10. Pinheiro, D. S., Santos, R. S. and Jardim, P. C. B. V. (2019). The combination of ACE I/D and ACE2 G8790A polymorphisms reveals susceptibility to hypertension: a genetic association study in Brazilian patients. *PLoS One*. 14 (8): e0221248.
 11. Richards, P. (2017). *Ebola: How a people's science helped end an epidemic*. London: Zed Books.
 12. Riou, J. and Althaus, C.L. (2020). Pattern of early human-to-human transmission of Wuhan 2019 novel coronavirus (2019-nCoV), December 2019 to January 2020. *Eurosurveillance*. 25(4).
 13. World Health Organization. (2020). *WHO Director-General's opening remarks at the media briefing on COVID-19—11 March 2020*. Geneva, Switzerland: World Health Organization; 2020. Available online at: <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19> “11-march-2020 Worldometers (April 9, 2020). *Coronavirus Update (Live)*. Available online at: <https://www.worldometers.info/coronavirus/>
 14. Wu, F., Zhao, S., Yu, B., Chen, Y.M., Wang, W. and Song, Z.G. (2020). A new coronavirus associated with human respiratory disease in China. *Nature*, 1–5.